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# Mathematics News Letter

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Published in the interest of the **Louisiana-Mississippi Section of the Mathematical Association of America** and the **Louisiana-Mississippi Branch of the National Council of Teachers of Mathematics.**

*A Challenge to Forward-looking Mathematics Teachers in the Colleges and High Schools of Louisiana and Mississippi.*



Vol. 2 BATON ROUGE, LA., MARCH, 1928 No. 5

## TO OUR COLLEGE PRESIDENTS

On March 30th and 31st, in Jackson, Mississippi, will be held the fourth annual meeting of the Louisiana-Mississippi Section of the Mathematical Association of America, and the first annual meeting of the Louisiana-Mississippi Branch of the National Council of Teachers of Mathematics. As you doubtless already know the latter organization is composed of high school teachers of mathematics. It should be gratifying to you and to all friends of mathematics to know that the official consolidation of all annual programs of these two bodies (which was effected at a joint meeting of the two in Shreveport last March) was declared at the recent Nashville meeting of the Mathematical Association of America to have set a pace for the entire country.

You are aware that the officials of the Section on the one hand and of the Council on the other have for some time been co-operative in the publication and distribution once a month of the Mathematics News Letter. Though this undertaking has been arduous and beset with handicaps it is scarcely to be doubted that its values must in the long run become evident. Every effort has been made to put into the Letter only first class material. It goes now to practically all college and high school mathematics teachers in our two States, our mailing list—built up by great effort—containing approximately 1200 names. To secure a reduction of expense in mailing it out we have fixed upon a nominal subscription price—fifty cents—a condition necessary before second class mailing privilege may be had.

One of the objects of this letter to you—a letter which is being sent to all college and university presidents of the two States—is that you may be impressed with the seriousness of the efforts which are being made in this part of the South to quicken interest in mathematics teaching, to lead more students to major in mathematics, to re-assert more vigorously the educational values of mathematics in school and college programs.

Another purpose in this writing is to plead for your utmost co-operation with us in the plan to make the Jackson meeting of mathematicians, March 30th, 31st, so outstandingly effective that its influence for good shall be permanently felt in all the colleges of our States.

**We urge you to be present at this meeting! Two of our Presidents outside of Jackson have already pledged their presence, one of these, President Walker, being engaged to participate in the program. What a triumph it would be for the queen of the sciences if twenty college administrators could be counted at our banquet table on Friday evening, March 30th!**

After all has been said about the oldest of the sciences—a science unique in being universally styled the exact science—can we honor it too much? It is the hardening, the true alloy of training; put otherwise, mathematics is the mind's supreme gymnasium in which analysis acquires maximum keenness, thought assumes its heaviest loads the longest time, discrimination is most sharpened and the stern disciplines of logic most abound.

We hope that you shall be willing to approve the use of your administrative influence to promote in every possible way the success of this meeting of M. A. of A. in Jackson, even though you should not find it practicable to be personally present.

## A TESTING TIME

It may safely be said that nowhere else in America have more serious organized efforts been made to unite the teachers of mathematics in programs directed to deepening both professional and technical interest in their subject than the efforts which have been put forth in the last several years by the Louisiana-Mississippi Section of the Mathematical Association of America. In the last twelve months these efforts have become reenforced by the Louisiana - Mississippi Branch of the National Council of Teachers of Mathematics, and the two organizations are now maintaining a close degree of cooperation.

So far as we know, no union of college and high school mathematics teachers other than this Louisiana-Mississippi union has undertaken to put out and to distribute among the teachers composing it a monthly publication containing, in addition to technical mathematics, stimulative and pedagogical matter, as well as matter directed to the solution of correlation problems of secondary and college programs.

Just now it would be difficult to measure results achieved. It is an easy temptation to rely upon inconclusive tests. If one hundred and fifty mathematically interested men and women should go up to Jackson, March 30, 31, the fact would be incontestable evidence of a very gratifying degree of progress in the direction of our objectives. On the other hand, it would not necessarily follow that an attendance figure much under this would imply insufficient progress. The campaign is still young. Yet, **March 30, 31 will in many senses be a testing time. May all the tests be met and met abundantly.**

## SUGGESTIONS TO THOSE WHO WILL ATTEND THE JACKSON MEETING

(1) Headquarters for the Section and Council members will be the Edwards Hotel.

Buses and automobiles which are to convey the visitors from Jackson to Clinton for the Friday evening dinner will have two points of departure: (a) Central High School, corner of West and Griffith streets, (b) Edwards Hotel Capitol Street.

Any subsequent change of this plan will be announced before the Council assembly Friday afternoon.

(2) Transportation of mathematical visitors to and from Clinton on Friday evening will involve no expense to them.

All those due to be present at the dinner should be at Edwards Hotel, or at Central High School, by 6:00 P. M.

(3) By all means should requests for dinner reservations be sent without delay. Cost of dinner will be one dollar, which may either be inclosed with reservation request, or paid after visitor reaches Clinton. Address the request to Professor J. R. Hitt, Mississippi College, Clinton, Miss.

(4) All mathematically interested individuals are permitted to make reservations for this dinner.

(5) Jackson hotels, available to visiting teachers at standard rates, are the following: Edwards Hotel, Heidelberg Hotel, Royal Hotel, Noble Hotel.

(6) The Council program, booked for Friday afternoon, be-

ginning at 3:30 o'clock, will be carried out at the Central High School auditorium. The Central High is at West and Griffith streets.

(7) The true spirit of cooperation between college and high school groups could have no finer exemplification than that afforded by, (a), a hundred per cent attendance of college men and women on the Council program Friday afternoon, (b), a hundred per cent attendance of high school teachers on the Saturday morning program of the Section.

*University of Cincinnati,*
*Department of Mathematics,*
*February 23, 1928.*

*Professor S. T. Sanders,*
*Louisiana State University,*
*Baton Rouge, La.*

*Dear Professor Sanders:*

*I wish to thank you for your kind letter of February 8th and the accompanying copy of the Mathematics News Letter. I like very much the idea of publishing such a journal for the teachers of mathematics in the two States, and I highly approve of your efforts to secure more cooperation between college and secondary school teachers. These two groups should have in common at least one fundamental interest, namely the improvement of the teaching of mathematics in this country, and this improvement will certainly be much accelerated if college teachers and secondary school teachers will agree to work together on the general problem.*

*I am looking forward to being with you and your colleagues of Louisiana and Mississippi at the time of the meeting in Jackson, and I am sure I shall enjoy the task of endeavoring to furnish some of the inspiration on that occasion. The subject on which I would prefer to speak is "Mathematics and Civilization". I shall try to outline briefly some of the ways in which the labors of mathematicians have assisted in the development of many of the important features of our present civilization and to indicate in what way future investigation and a wider knowledge of mathematics will contribute toward the building of a far higher civilization. I think the talk will be intelligible, not only to all the teachers of mathematics, but also to any other educated persons who may happen to be present.*

*I am entirely willing that you schedule my speech at any time that seems appropriate.*

*Yours sincerely,*
*CHARLES N. MOORE.*

# SKETCHES OF THOSE WHO LEAD AT JACKSON

## CHAS. N. MOORE

B. A., University of Cincinnati; M. S., George Washington University; Ph.D., Harvard University.

Computer in U. S Naval Observatory, 1903-05; Professor of mathematics in University of Cincinnati since 1924.

Member of the leading European mathematical societies. Member of Council of American Mathematical Society, the Mathematical Association of America, the National Committee on Mathematical Requirements (sponsored by M. A. of A.)

Contributor to mathematical and educational journals of America and Europe.

Official delegate of M A. of A. to the annual meeting of the Louisiana-Mississippi Section of M. A. of A., March 30, 31, 1928.

Research: Divergent series; Bessel's functions; Fourrier series.

## B. M. WALKER

Student, Mississippi A. & M. College, 1880-1883; B. S., Mississippi A. & M. College, 1883; M. Sc., Mississippi A. & M. College, 1886; Student, University of Virginia, summers of 1885-1886-1887; graduate work in mathematics 12 quarters, University of Chicago, Ph.D., University of Chicago, 1906. Title of Thesis: "The Resolution of the Higher Singularities of Algebraic Curves into Ordinary Nodes"; graduate work, University of Goettingen and University of Berlin, Germany.

Instructor in mathematics, Mississippi A. & M. College, 1883-1884; Assistant Professor of mathematics, 1884-1888; Professor of mathematics, 1888-1925; Dean of the Engineering School, 1902-1925; Vice-President, 1913-1925; President, 1925.

Director, Security State Bank, Starkville, Mississippi; Director and Vice-President, Starkville Cotton Oil Company, West Point Cotton Oil Mill, and Director, West Point Ice Factory; owner of city property, Starkville, Mississippi, country real estate in Oktibbeha, Clay, Lowndes, Noxubee Counties, Mississippi, and Catahoula Parish, Louisiana.

## CHAS. N. WUNDER

B. A., Randolph-Macon College; M. A., University of Virginia; Ph.D., University Virginia.

Acting Director of McCormick Observatory, University of Virginia, 1909-12, Associate Professor of applied mathematics, Davidson College, 1913-15, Professor of mathematics, Davidson College, 1917; Dean, Southwestern University, 1919; head of department of mathematics, University of Mississippi. Member of Phi Beta Kappa.

## HERBERT E. BUCHANAN

A. B., University of Arkansas; A. M., University of Chicago; Ph.D., University of Chicago.

Instructor in mathematics, University of Wisconsin, 1909-11, Associate Professor of mathematics, University of Tennessee, 1911-12, Professor of mathematics, University of Tennessee, 1912-20. Professor of mathematics, Tulane University since 1920.

Member of Mathematcial Society, of Mathematical Association of America, Tennessee Academy of Sciences, New Orleans Academy of Sciences.

Writer of several mathematical texts.

## W. PAUL WEBBER

Ph.D., University of Cincinnati, in mathematics and physics. Studied at Ohio and at Chicago. Research in Periodic Functions; member American Mathematical Society and Mathematical Association of America. Taught in Ohio,

Mississippi, Oklahoma, Pennsylvania, Louisiana. Professor Mathematics, L. S. U

Co-editor of Webber and Plant's Introductory Mathematical Analysis, Author: Webber Elementary Applied Mathematics; Articles on Secondary Mathematics in Mathematics' Teacher; Bulletins, Louisiana State University, on Secondary Mathematics.

**JAMES P. COLE**

Attended the public schools of Texas and Louisiana until January, 1908, when he entered the Louisiana State University. Graduated at L. S. U. in 1912. Commissioned as a Second Lieutenant in the U. S. Army. Retired as Major in 1919 on account of wounds received in action. Instructor in Mathematics at the Louisiana State University 1919-26. Head of the Department of Mathematics at the Louisiana Polytechnic Institute, Ruston, Louisiana, since 1926, in which year he received a Master's degree at L. S. U.

**J. R. HITT**

Left the ranches of Texas at the age of 21 to attend high school and college. Taught mathematics four years in Texas junior colleges. Taught sixteen years in the high schools of Texas. Again took up junior college work. Came to Missippi College in 1918 to take chair of mathematics.

**C. D. SMITH**

A. B., Mississippi College, 1915; M. S. University of Iowa, 1925; Ph.D., University of Iowa, 1928. Professor of mathematics Louisiana College, since 1917. U. S Army, 1917-19, rank, 1st Lieutenant F. A., U. S. A. Member of Louisiana Academy of Science; M. A. of A.; American Mathematical Society; Iowa chapter Sigma Xi.

**MRS. B. A. SUMMER**

B. A., University of Mississippi. Graduate work Louisiana State University. Taught mathematics five years in high schools of Mississippi. Head department of mathematics Columbia high school, Mississippi since 1924. Member of several educational associations.

**MISS NORMA TOUCHSTONE**

Graduate Louisiana State Normal and Louisiana State University. Graduate work University of Colorado and University of California. Taught mathematics in several Louisiana high schools. Taught mathematics in Bolton High School, Alexandria, since 1924.

**W. C. ROATEN**

B. S., Western Kentucky State Normal. Taught thirty years in the Louisiana schools. High school principal for twenty years. Taught in leading institutions of the State in summer sessions. Is President of L. T. A., Mathematics Section; Chairman La.-Miss. Council.

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## HISTORY OF $\pi$ (OR PI)

By DOROTHY RICE
Mississippi Delta State Teachers College

Few people who have not made a study of mathematics can realize the work and exhaustive study that was needed to give mathematicians just the tools of their trade. In olden times symbols were used to designate different quantities and the different relations of numbers and figures were almost wholly unknown. Chil-

dren studying the volume and area of pyramids, circles, cones and other figures do not realize that the relations and formulas given (to them) as facts are still being worked on by mathematicians (and have been since before Christ).

The history of one of these relations, the relation between the diameter of a circle and its circumference is a very interesting one. Many interesting and some amusing facts are found in a study of its history. When we go back to the Old Testament and read there that the circumference was taken as 3 times the diameter we see how long this relation, or $\overline{||}$ as we shall call it, has been a matter of speculation. It is rather amusing to find in our own time the State of Illinois passing a law that $\overline{||}$ should be $3^1/_7$ in the State of Illinois.*

Back in the days of the ancients the Babylonians took $\overline{||}$ as 3 and made their calculations on this basis. Archimides, a Greek found $\overline{||}$ to be less than $3^1/_7$ and more than $3\frac{10}{71}$. The early Chinese approximations were not much better, but by the fifth century a Chinese by the name of Tsu Ch'ang-Chih had obtained $\overline{||}$ between the limits of 3.1415927 and 3.1415926 which was accurate to 6 decimal places. The Japanese were much slower, and in 1666 Sato Siko in his Kongenki had obtained no better approximation than 3.14.

The Arabs in the ninth century used $\overline{||}$ as $3^1/_7$. Old records show that they had determined it as accurately as $\frac{62832}{2000}$, but this seems to have been lost and we find them using $3^1/_7$ in their calculations. Arybahata, a Hindoo, gives in one place a fairly accurate approximation $3\frac{177}{1250}$, but he did not use this value and neither did any of the Hindoos until after the twelfth century. These facts show the diverse opinions of the value of $\overline{||}$ in the olden times, but as the centuries pass by we find that each new calculation brings us nearer to the exact determination of $\overline{||}$. In the fifteenth and sixteenth centuries we find a revival of interest in mathematics, and by the seventeenth century we find some remarkably close values given for $\overline{||}$. John Gregory in 1667 gave several methods of approximating $\overline{||}$. Wallis who who lived in 1616 - 1703 obtained an infinite series approaching nearer and nearer instead of a finite series yielding an absolute value, but he was not at all satisfied with the results he got. Later Leibnitz, after a careful study of infinite series discovered the expression

$$\frac{\overline{||}}{4} = 1\text{-}1/3 + 1/5 - 1/7 + 1/9$$

etc., and in 1673 derived the series arctan

$$x = x - \frac{x}{3} x^3 + \frac{1}{5} x^5 - \frac{1}{7} x^7 + \ldots$$

Giulio Carlo anticipated Euler in the use of imaginary exponents and logarithms by introducing the formula

$$\overline{||} = 2i \log(1+i)/(1-i).$$

In 1779 Euler gave a series for arctan different from Gregory's which had been used before, which he applied to the formula 20 arc tan 1/7+8 arc tan 3/79 used for computing $\overline{||}$.

Even in recent years we find that men are still working on the best calculation for $\overline{||}$. In the November, 1926, number of the *American Mathematical Monthly*, we find a calculation with only a possible error of 12 in the 56th decimal place.

And so you see that mathematics is a very interesting science and that it has been a matter of interest to man since the earliest times. The history of $\overline{||}$ shows us that men are forever seeking basic truths by means of the science of mathematics, and that they will not be contented with less.

EDITORIAL NOTE: [H. L. Smith furnishes the following interesting item: "Professor H. E. Slaught has in his possession a copy of a bill which was once introduced into the Indiana assembly and which would have made $\overline{||} = 3$ in Indiana. This bill got as far as the third reading before a mathematics professor from Indiana University heard of it and succeeded in getting it suppressed."]

## CURRICULUM PROBLEMS IN SECONDARY MATHEMATICS

By W. D. REEVE
Teachers College, Columbia University

### Introduction

The educational problems of most interest at the present time relate to the curriculum. These extend from the National Education Association through its various divisions down to the smallest educational unit. This is evidenced by the various yearbooks that have recently appeared from such organizations as the Department of Superintendents of the National Educational Association[1], the National Society Society for the Study of Education[2] and the National Council of Teachers of Mathematics.[3]

It is the purpose of this paper

[1]Third, Fourth and Fifth Yearbooks (1925, 1926, 1927) of the National Education Association Department of Superintendence.

[2]Twenty-sixth Yearbook of the National Society for the Study of Education. Public School Publishing Company, Bloomington, Ill., 1926. Part I, Curriculum Making, Past and Present; Part II, The Foundations of Curriculum Making.

[3]Second Yearbook of the National Council of Teachers of Mathematics. Bureau of Publications, Teachers College, Columbia University, 1927. A consideration of 'Curriculum Problems in Teaching Mathematics."

to discuss the problems that relate particularly to the field of mathematics. These problems may be classified broadly under three heads, namely: those relating to the pupil, to the teacher, and to content.

### Problems Relating to the Pupil

The problems relating to the pupil are becoming increasingly difficult of solution. In the first place, the enormous increase in the high school population in the last thirty years has made absolutely necessary a change in content at least for many pupils. According to Professor Thorndike,[4] "Almost one in three of the children reaching their teens in the United States enters high school," and "The corresponding figure for 1890 is almost certainly not over one in ten." As Professor Thorndike has also pointed out, pupils differ not only in their native ability but also in their experiences and interests. He says, "We lack measures of inborn capacities of the one in ten or eleven of a generation ago and we have only very scanty measures of the capacities of the one in three today. We have, however, excellent reasons for believing that the one in ten had greater capacities for algebra and for intellectual tasks generally than the one in three today." This is all true in spite of the fact that recent studies show that in the American secondary school we have the best fifty per cent of American intelligence.

Various plans have been devised to take care of individual differences in ability among pupils. Some of the most noted are homogeneous classification of pupils, the Dalton Plan, the Winnetka Plan, the project method, the socialized recitation, and supervised study. While we should utilize the best in all of these, it is clear that none of them is a panacea for all the ills which beset the ordinary classroom. Supervised study, for example, is either study or it is not study. If the pupil studies it may be helpful; if the teacher does the studying, it is worthless.

In the second place, there is the question of the influence of emotionalized attitudes in learning. Professor Briggs[5] has given a very interesting discussion of this important question. We should know more about how such attitudes are developed and how they may reinforce our teaching. At the present time too many people dislike the study of mathematics. I believe that this is unnatural. Perhaps the trouble goes as far back as the arithmetic of the elementary school. Certainly the teacher at this point in

[4] Thorndike, E. L., "The Psychology of Algebra," page 3. MacMillan, 1923.
[5] Briggs, T. H., "Curriculum Problems." MacMillan, 1926.

the pupil's mathematical development has a great responsibility because of the importance of first impressions. There is some doubt as to whether all pupils should be encouraged and stimulated to continue the study of mathematics beyond the junior high school. But whether or not they continue they should not be taught to hate the subject.

In the third place, we have too many failures in ninth-grade algebra and the pupils spend a long time failing. We cannot justify failures of from twenty to forty per cent in a normal group in any school. Are there any pupils in such a group "who simply can't learn anything in algebra," or who, unable to learn a certain kind of algebra, are failed because the teacher does not know what else to do? Many failures are due to the lack of recognition of individual differences in ability and large numbers of deserving pupils have to pay the penalty. Moreover, the brilliant pupils as a result of our indifference are the most retarded pupils in the American schools. It is clear that our entire system of marking needs further investigation and a new method of marking inaugurated which will do justice to those pupils who are paying big returns on the capital invested. We know very little concerning how pupils learn most easily and most economically. In attempting to help the duller pupils we can learn a great deal about the difficulties which pupils generally encounter. In this way instruction even for the more gifted pupils may be improved.

We might raise many other questions that relate to the pupil. For example, what has his age to do with his chances to profit by studying a given subject? What has interest to do with his possible chance to succeed in mastering a given topic? Is a certain bit of content too difficult for the majority of pupils in a certain year? Who shall study geometry and for how long? Finally, what do we expect pupils to know in mathematics when we are through teaching them? Do we want one hundred per cent mastery in all things or may we be content with less in certain fields?

We have attempted to answer these and many more questions relating to mathematics, but not always successfully. For example we have encouraged speed at the expense of accuracy when we ought to know that speed in making errors is of no value. To be sure the best authorities differ as to what we are measuring and what we should measure. However, this is no argument against the great need for measuring at least what is taught or what should be taught.

### Problems Relating to the Teacher

We come next to the problems

that relate to the teacher of mathematics. One of the most vital questions is that of the necessary qualifications for a successful teacher of mathematics. In this respect our standards are far behind those of European countries. Almost anyone can teach mathematics in the United States. We now have teachers in some schools trying to teach trigonometry in the ninth year who have never studied the subject previously. The result is obvious. In some schools a person may be given an algebra class to teach merely because he happens to have a vacant period at the time the class is scheduled. It is an old story that the athletic coach is often given a class in mathematics to justify his employment in the school. We ought to be able presently to require the Calculus of all prospective high school teachers. This subject is already required for the bachelor's degree of student teachers of mathematics in some of our American institutions, notably at the University of Minnesota. At Teachers College, Columbia University, no one is given a diploma as Teacher of Mathematics or Supervisor of Mathematics who has not had a course in the Calculus.

The matter of the importance of a teacher's personality and his chance of success needs further study. Why do teachers fail? Can we by some scheme or other, decrease considerably the number who seem unable to succeed? Doubtless fewer teachers would fail if they knew more subject-matter, but knowledge of subject-matter alone will not save a teacher who is short on personality and the ability to understand pupils sympathetically. However, it is not always safe to conclude that a teacher is an artist merely because he obtains good results on achievement tests. Some of the best drill masters in the world have been anything but inspiring in the classroom. Teachers may be born and not made, but surely there is something in training.

We need to have more frequent meetings of teachers in the various departments of mathematics in this country to talk over their common problems. Teachers located in cities should form clubs like those in Chicago, Cleveland, Philadelphia, Detroit, Minneapolis and New York. These clubs have regular meetings and cooperate with the National Council of Teachers of Mathematics besides discussing their own local needs. The various State organizations should be tied up in some useful way with the National Council so that the work of improving instruction in mathematics may be more intelligently carried out.

Furthermore, teachers of mathematics, like those of other subjects, sometimes "get in a

rut." They do not keep up to date in their reading and they do not always renew their interest in their subject as they should by attendance at summer sessions or through the academic year at reputable institutions of learning. Every teacher of mathematics in this country should be a member of the National Council of Teachers of Mathematics and should regularly take and read its official organ—*The Mathematics Teacher*. This magazine is the only journal in existence devoted entirely to the elementary and secondary fields.

Another real problem is to secure better co-operation between the elementary teachers, the junior high school teachers, and those of the senior high school. At the present time each group knows too little about the work of the others. There is no doubt that the attitude of senior high school teachers toward their colleagues in the junior high school has been a serious handicap to the mathematics program of the latter. This attitude may be explained, but the explanation does not justify the failure to co-operate.

In certain parts of the country, especially in the East, teachers of mathematics are the victims of extra-mural examinations. These examinations grow out of a desire to standardize the mathematical product, but the results are detrimental to the best interests of mathematics. Teachers should be encouraged to have a philosophy of their own and to teach the subject as it ought to be taught rather than to try to prepare pupils for one final examination. This they will not do so long as they are forced to follow a course of study which they have had no hand in making or with which they are not in sympathy. No matter how desirable a curriculum may be, we cannot expect it to succeed if the classroom teachers are not given a chance to help in its construction.

A new day in mathematics ought to bring forth a generation of teachers who can set up their own objectives, select the content material best fitted to their realization, and with proper methods of teaching organize a testing program that will enable them to find out whether their aims can be realized.

To be concluded in the next issue of Mathematics News Letter.

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Professor S. T. Sanders,
Baton Rouge, La.

Covington, La.,
February 23, 1928.

Dear Sir:-

Enclosed please find money order for one dollar ($1.00) for a two year's subscription to the "MATHEMATICS NEWS LETTER." I am mathematics teacher in the Covington High School and am very much interested in the subject. I hope to be able to attend the Jackson meeting next month.

Very truly yours,
(MISS) ANNA DAVIS.